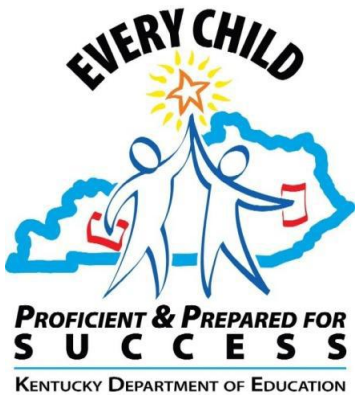
Eighth Grade – Mathematics

Kentucky Core Academic Standards with Targets



Grade Level/ Course (HS): 8th Grade	
Standard with code:	**8.NS.1 Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers, show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.**
Domain:	**The Number System**
Cluster:	**Know that there are numbers that are not rational and approximate them by rational number**
Type: ___X ___Knowledge _____Reasoning _____Performance Skill _____Product	

Knowledge Targets	Reasoning Targets	Performance Skills Targets	Product Targets
Define irrational numbers Show that the decimal expansion of rational numbers repeats eventually. Convert a decimal expansion which repeats eventually into a rational number. Show informally that every number has a decimal expansion.			

Make sense of problems and persevere in solving them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Grade Level/ Course (HS): 8th Grade	
Standard with code:	**8.NS.2 Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π^2). *For example, by truncating the decimal expansion of $\sqrt{2}$, show that $\sqrt{2}$ is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.***
Domain:	**The Number System**
Cluster:	**Know that there are numbers that are not rational, and approximate them by rational numbers.**
Type: _____Knowledge ___X___Reasoning _____Performance Skill _____Product	

Knowledge Targets	Reasoning Targets	Performance Skills Targets	Product Targets
Approximate irrational numbers as rational numbers. Approximately locate irrational numbers on a number line. Estimate the value of expressions involving irrational numbers using rational approximations. (For example, by truncating the decimal expansion of $\sqrt{2}$, show that $\sqrt{2}$ is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.)	Compare the size of irrational numbers using rational approximations.		

Make sense of problems and persevere in solving them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Grade Level/ Course: 8th Grade	
Standard with code:	**8.EE.1 Know and apply the properties of integer exponents to generate equivalent numerical expressions. *For example,* $3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27$.**
Domain:	**Expressions and Equations**
Cluster:	**Work with radicals and integer exponents.**
Type: __X___Knowledge _____Reasoning _____Performance Skill _____Product	

Knowledge Targets	Reasoning Targets	Performance Skills Targets	Product Targets
Explain the properties of integer exponents to generate equivalent numerical expressions. For example, $3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27$. Apply the properties of integer exponents to produce equivalent numerical expressions.			

Make sense of problems and persevere in solving them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Grade Level/ Course: 8th Grade	
Standard with code:	**8.EE.2 Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that the square root of 2 is irrational.**
Domain:	**Expressions and Equations**
Cluster:	**Work with radicals and integer exponents**
Type: ___X___Knowledge _____Reasoning _____Performance Skill _____Product	

Knowledge Targets	Reasoning Targets	Performance Skills Targets	Product Targets
Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares. Evaluate cube roots of small perfect cubes. Know that the square root of 2 is irrational.			

Make sense of problems and persevere in solving them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Grade Level/ Course: 8th Grade	
Standard with code:	**8.EE.3 Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other.** ***For example, estimate the population of the United States as 3×10^8 and the population of the world as 7×10^9, and determine that the world population is more than 20 times larger.***
Domain:	**Expressions and Equations**
Cluster:	**Work with radicals and integer exponents.**
Type: _____Knowledge ___X ___Reasoning _____Performance Skill _____Product	

Knowledge Targets	Reasoning Targets	Performance Skills Targets	Product Targets
Express numbers as a single digit times an integer power of 10. Use scientific notation to estimate very large and/or very small quantities.	Compare quantities to express how much larger one is compared to the other.		

Make sense of problems and persevere in solving them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Grade Level/ Course: 8th Grade	
Standard with code:	**8.EE.4 Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology.**
Domain:	**Expressions and Equations**
Cluster:	**Work with radicals and integer exponents.**
Type: _____Knowledge ___X___Reasoning _____Performance Skill _____Product	

Knowledge Targets	Reasoning Targets	Performance Skills Targets	Product Targets
Perform operations using numbers expressed in scientific notations. Use scientific notation to express very large and very small quantities.	Interpret scientific notation that has been generated by technology. Choose appropriate units of measure when using scientific notation.		

Make sense of problems and persevere in solving them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Grade Level/ Course: 8th Grade	
Standard:	**8.EE.5 Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways.** ***For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.***
Domain:	**Expressions and Equations**
Cluster:	**Understand the connections between proportional relationships, lines, and linear equations.**
Type: _____Knowledge __X___ Reasoning _____Performance Skill _____Product	

Knowledge Targets	**Reasoning Targets**	**Performance Skills Targets**	**Product Targets**
Graph proportional relationships.	Compare two different proportional relationships represented in different ways. (For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.) Interpret the unit rate of proportional relationships as the slope of the graph.		

Make sense of problems and persevere in solving them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Grade Level/ Course: 8th Grade	
Standard:	**8.EE.6 Use similar triangles to explain why the slope *m* is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation *y=mx* for a line through the origin and the equation *y=mx+b* for a line intercepting the vertical axis at *b*.**
Domain:	**Expressions and Equations**
Cluster:	**Understand the connections between proportional relationships, lines, and linear equations.**
Type: _____Knowledge __X__ Reasoning _____Performance Skill _____Product	

Knowledge Targets	Reasoning Targets	Performance Skills Targets	Product Targets
Identify characteristics of similar triangles. Find the slope of a line. Determine the y-intercept of a line. (Interpreting unit rate as the slope of the graph is included in 8.EE.)	Analyze patterns for points on a line through the origin. Derive an equation of the form y = mx for a line through the origin. Analyze patterns for points on a line that do not pass through or include the origin. Derive an equation of the form y=mx + b for a line intercepting the vertical axis at b (the y-intercept). Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane.		

Make sense of problems and persevere in solving them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Grade Level/ Course (HS): 8th Grade	
Standard with code:	**8.EE.7a Solve linear equations in one variable:** **a. Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form *x* = *a*, *a* = *a*, or *a* = *b* results (where *a* and *b* are different numbers).**
Domain:	**Expressions and Equations**
Cluster:	**Analyze and solve linear equations and pairs of simultaneous linear equations.**
Type: ___X___Knowledge _____Reasoning _____Performance Skill _____Product	

Knowledge Targets	Reasoning Targets	Performance Skills Targets	Product Targets
Give examples of linear equations in one variable with one solution and show that the given example equation has one solution by successively transforming the equation into an equivalent equation of the form *x = a.* Give examples of linear equations in one variable with infinitely many solutions and show that the given example has infinitely many solutions by successively transforming the equation into an equivalent equation of the form *a = a.* Give examples of linear equations in one variable with no solution and show that the given example has no solution by successively transforming the equation into an equivalent equation of the form *b = a,* where *a* and *b* are different numbers.			

Make sense of problems and persevere in solving them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Grade Level/ Course (HS): 8th Grade	
Standard with code:	**8.EE.7b Solve linear equations in one variable:** **b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.**
Domain:	**Expressions and Equations**
Cluster:	**Analyze and solve linear equations and pairs of simultaneous linear equations.**
Type: ___X___Knowledge _____Reasoning _____Performance Skill _____Product	

Knowledge Targets	Reasoning Targets	Performance Skills Targets	Product Targets
Solve linear equations with rational number coefficients. Solve equations whose solutions require expanding expressions using the distributive property and/ or collecting like terms.			

Make sense of problems and persevere in solving them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Grade Level/ Course (HS): 8th Grade	
Standard with code:	**8.EE.8a Analyze and solve pairs of simultaneous linear equations:** **a. Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.**
Domain:	**Expressions and Equations**
Cluster:	**Analyze and solve linear equations and pairs of simultaneous linear equations.**
Type: ___X___Knowledge _____Reasoning _____Performance Skill _____Product	

Knowledge Targets	Reasoning Targets	Performance Skills Targets	Product Targets
Identify the solution(s) to a system of two linear equations in two variables as the point(s) of intersection of their graphs. Describe the point(s) of intersection between two lines as points that satisfy both equations simultaneously.			

Make sense of problems and persevere in solving them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Grade Level/ Course (HS): 8th Grade	
Standard with code:	**8.EE.8b Analyze and solve pairs of simultaneous linear equations:** **b. Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection.** ***For example, 3x + 2y = 5 and 3x + 2y = 6 have no solution because 3x + 2y cannot simultaneously be 5 and 6.***
Domain:	**Expressions and Equations**
Cluster:	**Analyze and solve linear equations and pairs of simultaneous linear equations.**
Type: _____Knowledge ___X___Reasoning _____Performance Skill _____Product	

Knowledge Targets	Reasoning Targets	Performance Skills Targets	Product Targets
Define "inspection". Identify cases in which a system of two equations in two unknowns has no solution Identify cases in which a system of two equations in two unknowns has an infinite number of solutions. Solve a system of two equations (linear) in two unknowns algebraically. Solve simple cases of systems of two linear equations in two variables by inspection.	Estimate the point(s) of intersection for a system of two equations in two unknowns by graphing the equations.		

Make sense of problems and persevere in solving them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Grade Level/ Course (HS): 8th Grade	
Standard with code:	**8.EE.8c Analyze and solve pairs of simultaneous linear equations:** **c. Solve real-world and mathematical problems leading to two linear equations in two variables. *For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.***
Domain:	**Expressions and Equations**
Cluster:	**Analyze and solve linear equations and pairs of simultaneous linear equations.**
Type: _____Knowledge ___X___Reasoning _____Performance Skill _____Product	

Knowledge Targets	Reasoning Targets	Performance Skills Targets	Product Targets
Define "inspection". Identify cases in which a system of two equations in two unknowns has no solution Identify cases in which a system of two equations in two unknowns has an infinite number of solutions. Solve a system of two equations (linear) in two unknowns algebraically. Solve simple cases of systems of two linear equations in two variables by inspection.	Estimate the point(s) of intersection for a system of two equations in two unknowns by graphing the equations.		

Make sense of problems and persevere in solving them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Grade Level/ Course: 8th Grade	
Standard with code:	**8.F.1 Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.[1]** **[1]Function notation is not required in grade 8.**
Domain:	**Functions**
Cluster:	**Define, evaluate, and compare functions**
Type: __X____Knowledge _____Reasoning _____Performance Skill _____Product	

Knowledge Targets	Reasoning Targets	Performance Skills Targets	Product Targets
Define "inspection". Identify cases in which a system of two equations in two unknowns has no solution Identify cases in which a system of two equations in two unknowns has an infinite number of solutions. Solve a system of two equations (linear) in two unknowns algebraically. Solve simple cases of systems of two linear equations in two variables by inspection.	Estimate the point(s) of intersection for a system of two equations in two unknowns by graphing the equations.		

Make sense of problems and persevere in solving them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Grade Level/ Course: 8th Grade	
Standard with code:	**8.F.2 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change.**
Domain:	**Functions**
Cluster:	**Define, evaluate & compare functions**
Type: _____Knowledge ___X___Reasoning _____Performance Skill _____Product	

Knowledge Targets	Reasoning Targets	Performance Skills Targets	Product Targets
Identify functions algebraically including slope and y intercept. Identify functions using graphs. Identify functions using tables. Identify functions using verbal descriptions.	Compare and Contrast 2 functions with different representations. Draw conclusions based on different representations of functions.		

Make sense of problems and persevere in solving them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Grade Level/ Course: 8th Grade	
Standard with code:	**8.F.3 Interpret the equation y=mx+b as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. For example, the function $A=s^2$ giving the area of a square as a function of its side length is not linear because its graph contains the points (1,1), (2,4), and (3,9), which are not on a straight line.**
Domain:	**Functions**
Cluster:	**Define, evaluate & compare functions**
Type: _____Knowledge ___X___Reasoning _____Performance Skill _____Product	

Knowledge Targets	Reasoning Targets	Performance Skills Targets	Product Targets
Recognize that a linear function is graphed as a straight line. Recognize the equation y=mx+b is the equation of a function whose graph is a straight line where m is the slope and b is the y-intercept. Provide examples of nonlinear functions using multiple representations.	Compare the characteristics of linear and nonlinear functions using various representations.		

Make sense of problems and persevere in solving them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Grade Level/ Course: 8th Grade	
Standard with code:	**8.F.4 Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x,y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of a situation it models, and in terms of its graph or a table of values.**
Domain:	**Functions**
Cluster:	**Use functions to model relationships between quantities.**
Type: _____Knowledge ___X____Reasoning _____Performance Skill _____Product	

Knowledge Targets	Reasoning Targets	Performance Skills Targets	Product Targets
Recognize that slope is determined by the constant rate of change. Recognize that the y-intercept is the initial value where x=0. Determine the rate of change from two (x,y) values, a verbal description, values in a table, or graph. Determine the initial value from two (x,y) values, a verbal description, values in a table, or graph.	Construct a function to model a linear relationship between two quantities. Relate the rate of change and initial value to real world quantities in a linear function in terms of the situation modeled and in terms of its graph or a table of values.		

Make sense of problems and persevere in solving them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Grade Level/ Course: 8th Grade	
Standard with code:	**8.F.5 Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.**
Domain:	**Functions**
Cluster:	**Use functions to model relationships between quantities.**
Type: _____Knowledge ___X___Reasoning _____Performance Skill _____Product	

Knowledge Targets	Reasoning Targets	Performance Skills Targets	Product Targets
Analyze a graph and describe the functional relationship between two quantities using the qualities of the graph. Sketch a graph given a verbal description of its qualitative features.	Interpret the relationship between x and y values by analyzing a graph.		.

Make sense of problems and persevere in solving them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Grade Level/ Course : 8th Grade	
Standard with code:	**8.G.1abc Verify experimentally the properties of rotations, reflections, and translations:** **a. Lines are taken to lines, and line segments to line segments of the same length.** **b. Angles are taken to angles of the same measure.** **c. Parallel lines are taken to parallel lines.**
Domain	**Geometry**
Cluster:	**Understand congruence & similarity using physical models, transparencies, or geometry software.**
Type: _____Knowledge __X__Reasoning _____Performance Skill _____Product	

Knowledge Targets	Reasoning Targets	Performance Skills Targets	Product Targets
Define & identify rotations, reflections, and translations. Identify corresponding sides & corresponding angles. Understand prime notation to describe an image after a translation, reflection, or rotation. Identify center of rotation. Identify direction and degree of rotation. Identify line of reflection.	Use physical models, transparencies, or geometry software to verify the properties of rotations, reflections, and translations (ie. Lines are taken to lines and line segments to line segments of the same length, angles are taken to angles of the same measure, & parallel lines are taken to parallel lines.)		

Make sense of problems and persevere in solving them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Grade Level/ Course : 8th Grade	
Standard with code:	**8.G.2 Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.**
Domain	**Geometry**
Cluster:	**Understand congruence & similarity using physical models, transparencies, or geometry software.**
Type: _____Knowledge __X__Reasoning _____Performance Skill _____Product	

Knowledge Targets	Reasoning Targets	Performance Skills Targets	Product Targets
Define congruency. Identify symbols for congruency.	Apply the concept of congruency to write congruent statements. Reason that a 2-D figure is congruent to another if the second can be obtained by a sequence of rotations, reflections, translation. Describe the sequence of rotations, reflections, translations that exhibits the congruence between 2-D figures using words.		

Make sense of problems and persevere in solving them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Grade Level/ Course : 8th Grade	
Standard with code:	**8.G.3 Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.**
Domain	**Geometry**
Cluster:	**Understand congruence & similarity using physical models, transparencies, or geometry software.**
Type: _____Knowledge __X__Reasoning _____Performance Skill _____Product	

Knowledge Targets	Reasoning Targets	Performance Skills Targets	Product Targets
Define dilations as a reduction or enlargement of a figure. Identify scale factor of the dilation.	Describe the effects of dilations, translations, rotations, & reflections on 2-D figures using coordinates.		

Make sense of problems and persevere in solving them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Grade Level/ Course : 8th Grade	
Standard with code:	**8.G.4 Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.**
Domain	**Geometry**
Cluster:	**Understand congruence & similarity using physical models, transparencies, or geometry software.**
Type: _____Knowledge __X__Reasoning _____Performance Skill _____Product	

Knowledge Targets	Reasoning Targets	Performance Skills Targets	Product Targets
Define similar figures as corresponding angles are congruent and corresponding sides are proportional. Recognize symbol for similar.	Apply the concept of similarity to write similarity statements. Reason that a 2-D figure is similar to another if the second can be obtained by a sequence of rotations, reflections, translation, or dilation. Describe the sequence of rotations, reflections, translations, or dilations that exhibits the similarity between 2-D figures using words and/or symbols.		

Make sense of problems and persevere in solving them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Grade Level/ Course : 8th Grade	
Standard with code:	**8.G.5 Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. *For example, arrange three copies of the same triangle so that the three angles appear to form a line, and give an argument in terms of transversals why this is so.***
Domain	**Geometry**
Cluster:	**Understand congruence and similarity using physical models, transparencies, or geometry software.**
Type: _____Knowledge __X__Reasoning _____Performance Skill _____Product	

Knowledge Targets	Reasoning Targets	Performance Skills Targets	Product Targets
Define similar triangles Define and identify transversals Identify angles created when parallel line is cut by transversal (alternate interior, alternate exterior, corresponding, vertical, adjacent, etc.)	Justify that the sum of interior angles equals 180. (For example, arrange three copies of the same triangle so that the three angles appear to form a line.) Justify that the exterior angle of a triangle is equal to the sum of the two remote interior angles. Use Angle-Angle Criterion to prove similarity among triangles. (Give an argument in terms of transversals why this is so.)		

Make sense of problems and persevere in solving them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Grade Level/Course (high School): 8th Grade	
Standard with Code:	**8.G.6 Explain a proof of the Pythagorean Theorem and it's converse.**
Domain:	**Geometry**
Cluster:	**Understand and apply the Pythagorean theorem.**
Type: _X___Knowledge ___Reasoning _____Performance Skill _____Product	

Knowledge Targets	**Reasoning Targets**	**Performance Skill Targets**	**Product Targets**
Define key vocabulary: square root, Pythagorean Theorem, right triangle, legs a & b, hypotenuse, sides, right angle, converse, base, height, proof. Be able to identify the legs and hypotenuse of a right triangle. Explain a proof of the Pythagorean Theorem. Explain a proof of the converse of the Pythagorean Theorem.			

Make sense of problems and persevere in solving them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Grade Level/Course (high School): 8th Grade							
Standard with Code:	**8.G.7 Apply the Pythagorean theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.**						
Domain:	**Geometry**						
Cluster:	**Understand and apply the Pythagorean theorem.**						
Type: _____Knowledge __X__Reasoning _____Performance Skill _____Product							
Knowledge Targets		**Reasoning Targets**		**Performance Skill Targets**		**Product Targets**	
Recall the Pythagorean theorem and its converse.		Solve basic mathematical Pythagorean theorem problems and its converse to find missing lengths of sides of triangles in two and three-dimensions. Apply Pythagorean theorem in solving real-world problems dealing with two and three-dimensional shapes.					
Make sense of problems and persevere in solving them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Grade Level/Course (high School): 8th Grade							
Standard with Code:	**8.G.8 Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.**						
Domain:	**Geometry**						
Cluster:	**Understand and apply the Pythagorean Theorem.**						
Type: _____Knowledge __X___Reasoning _____Performance Skill _____Product							
Knowledge Targets		**Reasoning Targets**		**Performance Skill Targets**		**Product Targets**	
Recall the Pythagorean Theorem and its converse.		Determine how to create a right triangle from two points on a coordinate graph. Use the Pythagorean Theorem to solve for the distance between the two points.					
Make sense of problems and persevere in solving them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Grade Level/Course: 8th Grade	
Standard with Code:	**8.G.9 Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.**
Domain:	**Geometry**
Cluster:	**Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.**

Type: _____Knowledge __X__Reasoning ___ __Performance Skill _____Product

Knowledge Targets	Reasoning Targets	Performance Skill Targets	Product Targets
Identify and define vocabulary: cone, cylinder, sphere, radius, diameter, circumference, area, volume, pi, base, height Know formulas for volume of cones, cylinders, and spheres.	Compare the volume of cones, cylinders, and spheres. Determine and apply appropriate volume formulas in order to solve mathematical and real-world problems for the given shape. Given the volume of a cone, cylinder, or sphere, find the radii, height, or approximate for π.		

Make sense of problems and persevere in solving them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Grade Level/ Course (HS): 8th Grade	
Standard with code:	**8.SP.1 Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.**
Domain:	**Statistics and Probability**
Cluster:	**Investigate patterns of association in bivariate data.**
Type: _____Knowledge ___X___Reasoning ____Performance Skill ____Product	

Knowledge Targets	Reasoning Targets	Performance Skills Targets	Product Targets
Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association Construct scatter plots for bivariate measurement data	Interpret scatter plots for bivariate (two different variables such as distance and time) measurement data to investigate patterns of association between two quantities		

Make sense of problems and persevere in solving them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Grade Level/ Course (HS): 8th Grade	
Standard with code:	**8.SP.2 Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.**
Domain:	**Statistics and Probability**
Cluster:	**Investigate patterns of association in bivariate data.**
Type: _____Knowledge __X__Reasoning _____Performance Skill _____Product	

Knowledge Targets	**Reasoning Targets**	**Performance Skills Targets**	**Product Targets**
Know straight lines are used to model relationships between two quantitative variables	Informally assess the model fit by judging the closeness of the data points to the line. Fit a straight line within the plotted data.		

Make sense of problems and persevere in solving them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Grade Level/ Course : 8th Grade	
Standard with code:	**8.SP.3 Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept.** ***(For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height.)***
Domain:	**Statistics and Probability**
Cluster:	**Investigate patterns of association in bivariate data.**
Type: _____Knowledge ___X___Reasoning _____Performance Skill _____Product	

Knowledge Targets	**Reasoning Targets**	**Performance Skills Targets**	**Product Targets**
Find the slope and intercept of a linear equation.	Interpret the meaning of the slope and intercept of a linear equation in terms of the situation. (For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height.) Solve problems using the equation of a linear model.		

Make sense of problems and persevere in solving them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Grade Level/ Course : 8th Grade	
Standard with code:	**8.SP.4 Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables.** ***(For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores?)***
Domain:	**Statistics and Probability**
Cluster:	**Investigate patterns of association in bivariate data.**
Type: _____Knowledge __X___Reasoning _____Performance Skill _____Product	

Knowledge Targets	Reasoning Targets	Performance Skills Targets	Product Targets
Recognize patterns shown in comparison of two sets of data. Know how to construct a two-way table.	Interpret the data in the two-way table to recognize patterns. (For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores?) Use relative frequencies of the data to describe relationships (positive, negative, or no correlation)		

Make sense of problems and persevere in solving them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.